400 years later, agriculture comes full circle at Bosque del Apache

"We traveled nearly four leagues and camped for the night across from the second pueblo, called Qualacú…where we remained living in tents, for a month…to provision the army with ***maize****. Diego de Zubía, the purveyor general, brought the provisions."* –Account from Oñate's 1598 expedition

In 1598, Spanish Conquistador Don Juan de Oñate and his expedition traveled north from Mexico City to the colony of New Mexico, crossing what would become Bosque del Apache National Wildlife Refuge. The remnants of Qualacú, where Oñate's expedition camped and purchased maize (corn) from the Piro people, are still present at Bosque del Apache. Archeological evidence shows native people in the Middle Rio Grande Valley made the transition from nomadic hunter-gathers to sedentary agricultural civilizations long before other native people in North America. They mastered sophisticated technologies that supported centuries of sustainable civilization and agricultural production on the fertile banks of the Rio Grande. They were so successful that they had a surplus of corn to give to Oñate's hungry expedition when they arrived in 1598.

From the time of the Piro pueblos encountered by Oñate to today, the Middle Rio Grande Valley has been an important migratory corridor and wintering area for sandhill cranes. However, the winter presents a physical challenge to these birds. Wetlands can provide a diverse and nutritious diet but grain crops which are rich in complex carbohydrates are easily digested, making them a quick source of energy for surviving cold, winter nights. Bosque del Apache annually grows 300 acres of corn for sandhill cranes. In doing this, the refuge maximizes the benefit of this small parcel of land in an altered and changing modern landscape.

The national wildlife refuge system has committed that by 2016 the use of all genetically modified crops (GMO's) will be banned on refuge lands. Bosque del Apache abandoned the use of GMO's years ago and has remained committed to using only non-GMO varieties. Refuge water manager, Brian Greeves, saw room to do even more, "Our corn needed irrigation water every nine days, and as water manager, I can assure you, our water is in limited supply in this drought." Additionally, Brian was frustrated by the corn production lost to worms and other pests and the amount of herbicide used for pest management. Brian believed there had to be a better way to feed the cranes while promoting sound agriculture and the refuge's role in land stewardship.

In 2011, the refuge experimented with Aztec heirloom corn and the project was showing promise until the corn was eaten by elk. Learning from past lessons, Brian partnered with Native Seeds, a Tuscon Arizona based non-profit organization, to test seven varieties of heirloom seeds. "I learned that many varieties of heirloom seeds propagated in the southwest are naturally hardier, drought tolerant and because of a tighter husk, naturally more resistant to damage from worms and other pests" said Greeves. Further promoting the benefit of southwestern corn varieties Brian boasts, "These plants were propagated to thrive in our

environment." Brian's meticulous planting of the seven varieties has resulted in the refuges wage maintenance staff affectionately nicknaming him, "Brian Cornseed."

Varieties include Dia de San Juan, Chapolate, Mayo Toshabatchi, Rio Grande Blue, Gila Pima, Tohono O'ohdam and Guarijio Maiz Amarillo. "We are only mid-way through growing season, and they all look good, but the San Juan, Blue, and Chapolate show the most promise." Brian remarked. "The best part, I've only watered twice and haven't sprayed a drop of pesticide and it looks better than the conventional corn fields on the refuge."

While there has been initial success, there are still many unknowns. Will the corn survive the elk this time? The refuge has constructed an electric fence that seems to be working. The seven varieties were planed adjacent to each other and corn is a wind pollinator. How much, if any, cross pollination will occur? Will the blue, brown or black varieties match the crane's search image for corn? Does heirloom seed possess the same energetic value to cranes as modern non-GMO seeds? The refuge plans to have the energetic qualities evaluated
Initial success has been sufficient for the refuge to expand the acreage planted with heirloom seeds in 2015.

If production is successful the refuge plans to harvest some seed for next year's crop. "In addition, we are continuing to collaborate with native seed suppliers to obtain and test other heirloom varieties" says Brian. If the heirloom corn proves to be nutritionally sufficient and the cranes will forage on it, the refuge hopes to produce all 300 acres of corn with heirloom seeds. Any surplus seeds over the needs of the cranes could be harvested for replanting at Bosque del Apache and potentially other refuges and conservation areas. "If refuges can protect endangered species perhaps it is a fitting role for refuges to protect and propagate ancient varieties of seeds?" said Brian.

Several of the corn varieties being used were propagated by the native people of the Middle Rio Grande Valley and today corn remains an important part of their cultural heritage. A partnership with the pueblos of the Rio Grande Valley, other tribes and the refuge system is a natural fit. The refuge hopes to bring the land, the people, and their corn, full circle.